Center for Integrative Coastal Observation, Research, and Education (CICORE)

Region: West Coast, California
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Project Summary

The Center for Integrative Coastal Observation, Research, and Education (CICORE) is a distributed coastal ocean observatory focusing on the most critically impacted region of the ocean, the region from a depth of 100 meters in to and onto the shore, including estuaries, wetlands, and other critical coastal habitats. CICORE provides high-resolution bathymetry and habitat maps, remote sensing imagery, and continuous in-situ oceanographic and meteorological data to scientists, resource agencies, and the public for use in education, research, resource management, and public policy. All data products are publicly available on-line.

IOOS

This project is contributing to the Integrated Ocean Observing System (IOOS) by

- Measuring essential water quality parameters along the coast of California and providing the data to the National Data Buoy Center
- Assisting the National Marine Sanctuaries and California Department of Fish and Game in the design and evaluation of marine protected areas and identification of essential fish habitat
- Supporting seafloor canyon surveys to help the U.S. Geological Survey in predicting the occurrence and magnitude of tsunamis along the California coast

Key Accomplishments

Water Quality

- CICORE has deployed 12 in-situ sensor arrays to measure water quality parameters along the California coast, including San Francisco Bay. These systems comprise a significant proportion of the continuous monitoring hardware in the Central and Northern California Ocean Observing System (CeNCOOS) and the Southern California Coastal Ocean Observing System (SCCOOS). The data are being used by Humboldt State University, California State University (CSU) East Bay, and Moss Landing Marine Laboratory to model and interpret coastal hydrodynamic processes that influence water quality, sedimentation, and primary productivity, and to measure human impacts on water quality along the coast. The U.S. Geological Survey (USGS) uses CICORE data to schedule benthic surveys in San Francisco Bay, and CICORE data from Los Angeles Harbor was used by the Port of Los Angeles, the Los Angeles Regional Water Quality Control Board, and California Department of Fish and Game (DFG) to document the lethal effects of illegal fish waste dumping, leading to prosecution. The data are or will be served through the National Data Buoy Center by the end of 2006.

Seafloor Mapping

- With CICORE funding, the Seafloor Mapping Laboratory (SFML) at CSU Monterey Bay has conducted extensive high-resolution acoustic surveys of bathymetry and substrate characteristics to produce detailed seafloor habitat maps. These maps are used by the National Marine Sanctuaries and DFG in the designation and evaluation of marine protected areas and identification of essential fish habitats throughout California state waters.

Beach Replenishment and Sediment Transport

- CICORE provided support to SFML for a series of bathymetric surveys to monitor dredge-spoil disposal at Ocean Beach, San Francisco. U.S. Army Corps of Engineers and USGS are using the data to test novel methods for sand replenishment of Ocean Beach, which is eroding. USACE and USGS are also using the sediment transport data to develop new models of sediment movement and hydrodynamics needed to manage the dredging operations required to keep the mouth of San Francisco Bay open to commercial shipping.

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Submarine Canyon Surveys

- CICORE supported SFML surveys of landslides and sediment slumping in submarine canyons. Repeated surveys of these seismically active canyons have provided insight into earth movement dynamics, which can displace large volumes of water. USGS is using these data to help predict the occurrence and magnitude of tsunamis along the California coast.

Hyperspectral Airborne Imaging (HSI)

- CICORE conducted bathymetric and high-resolution hyperspectral airborne imaging (HSI) surveys of Humboldt Bay in northern California. Humboldt Bay has extensive eelgrass beds that support a number of commercially important species. Bathymetry and eelgrass habitat maps are being used by DFG, California Sea Grant, and the Humboldt Bay Harbor District to map shipping channels and manage biological resources. CICORE has used HSI to map coastal kelp beds with a high degree of precision. The hyperspectral technology allows better discrimination between kelp and other types of algae, thus providing the most accurate inventory of kelp resources to date. DFG and the Monterey Bay National Marine Sanctuary used the data to set commercial kelp harvest quotas. Algorithms are now being developed to determine different age classes of kelp, which will further refine harvesting plans.

Regional Partnerships

- CICORE's water quality monitoring network has aided the development of the California Coastal Ocean Currents Monitoring Program, a state-funded program that models coastal surface current circulation. CICORE has helped sustain the University of California, Santa Cruz, Center for Integrated Marine Technologies (CIMT) and, together, these programs constitute a significant portion of the observing activities in the CeNCOOS region. CICORE also works with SCCOOS to promote ocean observing in southern California.

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